ISBN 1188–4169

Canada Communicable Disease Report

Vol . 23–13

Date of publication: 1 July 1997

Contained in this FAX issue: *(No. of pages: 5)*

Official page numbers:

OUTBREAK OF RUBELLA ORIGINATING AMONG HIGH-SCHOOL STUDENTS — SELKIRK, MANITOBA	F-1	97– 101
GROUP A STREPTOCOCCAL NECROTIZING FASCIITIS FOURNIER'S GANGRENE — QUEBEC	F-3	101 –103
ERRATUM	F-5	104

For reference purposes, citing should refer to the page numbers of the printed copy and not to those of the FAX copy (F-#).

OUTBREAK OF RUBELLA ORIGINATING AMONG HIGH-SCHOOL STUDENTS — SELKIRK, MANITOBA

Introduction

Selkirk is a town of almost 10,000 people situated north of Winnipeg in Manitoba's Interlake Health Region. Lord Selkirk Regional Comprehensive High School is the only secondary school in the region, with 100 staff members and over 1,200 students from the town and from outlying areas.

Over Thanksgiving weekend 1996 and early in the following week (12-16 October inclusive), 36 cases of rash illness in Selkirk residents were reported to the Interlake Health Region office. The rash was often itchy, described as pinpoint or macular, and began usually on the face moving downward to include the trunk and sometimes the extremities. Reports came from the emergency department of the Selkirk and District General Hospital, the town's pediatricians and family physicians, and the high school. Cases were primarily, but not exclusively, in male students.

By 16 October, Cadham Provincial Laboratory had analysed the first 12 serologic specimens that had been submitted from outbreak cases. Red measles IgM antibody was negative for all 12 specimens. Rubella IgM antibody was positive in four cases, "borderline" in two, and negative in the remaining six.

On the basis of the clinical and laboratory evidence, Manitoba Department of Health, all physicians in the Interlake Health Region, high-school staff and students, and the general public in the Selkirk area were immediately alerted by the medical officer of health, Interlake Health Region, to an outbreak of rubella. The main purpose of the alert was to increase awareness of the outbreak to reduce transmission to any susceptible pregnant women. It was also anticipated that increased awareness would facilitate more complete reporting of cases. Details of the beginning of the outbreak, which is still proceeding, are described below.

Methods

During the 6 weeks from mid-October to the end of November 1996, intensive efforts were made to identify and characterize all cases of rubella that were reported to Interlake Health Region with an epidemiologic link to the Selkirk high-school staff and students. There were three sources of reports:

- laboratory-confirmed (rubella IgM-positive result in a clinical case)
- clinical reports from physicians (written report to Manitoba Department of Health)
- clinical reports from public health-nurses (case meeting a case definition).

The case definition that was developed was a typical rash illness in a resident of the Interlake Health Region linked to high-school staff and students during the stated time period, exclusive of any other diagnosis. The typical rash was described as diffuse, pinpoint or macular, usually involving face, trunk, sometimes extremities. It was often noted to be itchy. Most cases were mild, lasting only a few days. However, some were accompanied by fatigue or loss of appetite, with a more prolonged course. Many felt feverish, had sore eyes or sore joints, and had enlarged glands in the neck area. Some also had upper respiratory symptoms and a sore throat.

Cases were actively looked for during the 6-week study period, particularly in the high school. Students absent from school were contacted by the public-health nurse to determine if they met the case definition. Information on the extent and progress of the outbreak was shared with physicians, and it was requested that clinical cases be reported.

The Manitoba Immunization Monitoring System (MIMS), computerized database assisted in confirming previous immunization status of cases. Prior rubella immunization was confirmed only if there was a MIMS or written record which included the date of rubella immunization.

Information obtained was entered into EpiInfo 6.0 and analysed.

Results

A total of 175 cases were reported to the Interlake Health Region in the 6-week period of the study (mid-October to the end of November 1996); 43 were laboratory-confirmed, 20 were clinical reports from physicians, and 112 were clinical reports from public-health nurses. Most cases were in the high-school students. Other cases had an epidemiologic link to the school (teachers and support staff, younger children riding the same school bus, or friends and family members of students).

Figure 1 shows the epidemiologic curve for onset of cases in the first 6 weeks of the outbreak. The earliest date of onset was 11 October 1996. A peak in cases was then seen from 14 October to 20 October. A smaller peak subsequently occurred in late October and early November. Of a total of 175 reported cases, 141 were male (80.6%) and 34(19.4%) were female. Figure 2 shows the number of cases by age. The mean age was 16.5 years (range: infant to 46 years).

Table 1 shows the immunization status of the cases. No cases in pregnant women were reported during the study, although at least six students attending the school at that time were known to be pregnant.

Figure 1
Number of cases of rubella, by date of onset

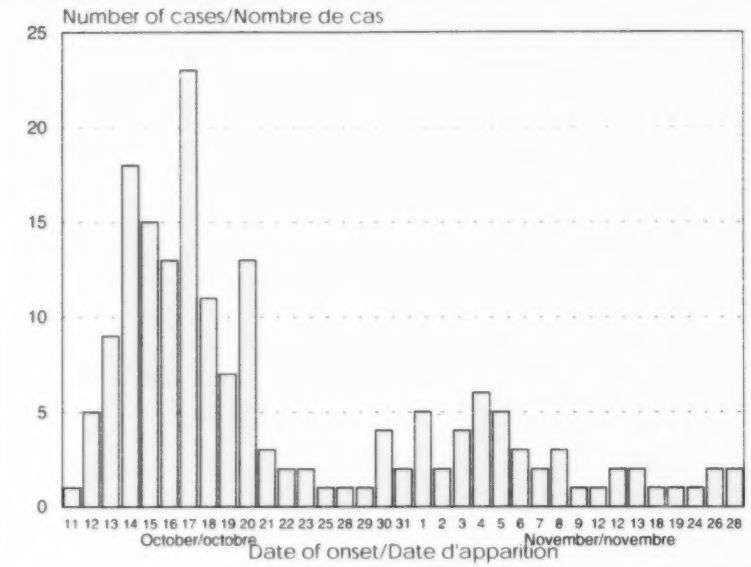

Number of cases/Nombre de cas
25
20
15
10
5
0
11 12 13 14 15 16 17 18 19 20 21 22 23 25 28 29 30 31 1 2 3 4 5 6 7 8 9 12 12 13 18 19 24 26 28
October/octobre
November/novembre
Date of onset/Date d'apparition

Table 1
Immunization status

	Prior rubella immunization			
	Yes	No	Unknown	Total
All cases	45	124	6	175*
Laboratory-confirmed cases	7	36	—	43**
Female cases	16	13	5	34***

* 25.7% of all cases were known to be previously immunized.
** 16.3% of laboratory-confirmed cases were known to be previously immunized.
*** 47.0% of all female cases were known to be previously immunized.

Comments

The majority of rubella cases reported in this outbreak are in adolescent males. Prior rubella immunization policy in Manitoba and elsewhere was directed at protecting females of childbearing age rather than the whole population. It was not until 1982 to 1983 that universal immunization of all 1-year-olds became provincial policy in Manitoba. The overall age and sex distribution is therefore not surprising. However, it is a matter of concern that a significant number of females are susceptible (34 females were cases in the first 6 weeks, representing 19.4% of total cases). Also, it is of concern that a substantial proportion of cases (25.7%) occurred in persons with documented rubella immunization.

During the initial 6 weeks, there were 43 laboratory- confirmed cases. A further 20 cases were clinically reported by physicians. With active surveillance in the school by public-health nurses, an additional 112 cases were identified, indicating that a surveillance system largely based on laboratory confirmation may greatly underestimate true incidence of the disease. This is particularly the case for rubella, as the disease is clinically mild, reducing the amount of serologic testing that will realistically occur. Also, blood drawn too early in the course of rubella illness, particularly less than 48 hours after rash onset, is likely to be rubella IgM negative (D. Kolton, Cadham Provincial Laboratory, Winnipeg: personal communication, 1996).

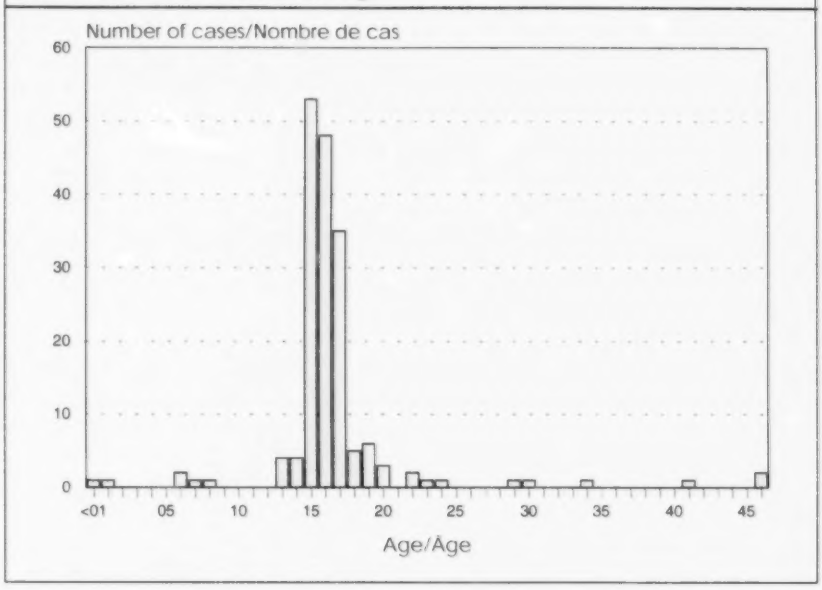
It is recommended that rubella cases be excluded from school or the workplace for 7 days following onset of rash[1,2]. This public-health intervention has been applied in Manitoba throughout the outbreak. Questions have arisen however about the effectiveness of this measure in reducing transmission, particularly as it is felt that most transmission likely occurs prior to and in the first days following onset. The value of a rubella-exclusion policy merits further discussion.

The most important issue is how to protect females of childbearing age against rubella. There are various potential strategies available for consideration in addressing the situation. Possible options include an measles and rubella (MR) immunization program for post-elementary schools (a provincial initiative in the fall of 1996 gave MR vaccine to children up to Grade 6), or a rubella immunization program for susceptible males.

particularly those still in school. A more direct option would be serologic testing of all adolescent girls, or of all women planning a pregnancy, to establish rubella immune status prior to first pregnancy, with immunization if indicated.

The rubella outbreak is ongoing in Interlake Health Region. As of 2 May, a total of 321 cases have been reported in residents of the region; 83.7% of these are in males, with 40.2 % of the cases being laboratory-confirmed. Cases are occurring throughout Manitoba as well, particularly in Winnipeg and the southern parts of the province (Central, Eastman, and Westman Health Regions). A total of 2,766 cases have been reported provincially as of 2 May, with no definite decline yet in sight. Overall for Manitoba, 84% of reported cases are in males (50% being males 15 to 18 years of age, and a further 32% being males 19 years of age and older); 43% of reported cases were laboratory-confirmed, and 31% of reported female cases had prior rubella immunization (Dr. D Horne, Manitoba Department of Health, Winnipeg: personal communication, 1997). An enhanced provincial program is being developed for surveillance of congenital rubella syndrome.

Figure 2
Number of cases of rubella, by age in years
Nombre de cas de rubéole selon l'âge



Acknowledgements

The cooperation and assistance of the following are greatly appreciated: public-health nurses and physicians of the Interlake Health Region; June Curtis of the Selkirk and District General Hospital; staff and students of the Lord Selkirk Regional Comprehensive High School, Bev Bell and Diana Burzuik; Donna DeLaurier of The Selkirk Journal; Donna Kolton of the Cadham Provincial Laboratory; Dr. Digby Horne and Lynda Graham of the Manitoba Public Health Branch.

References

1. Benenson AB, ed. *Control of Communicable Diseases Manual.* 16th ed. Washington, DC: American Public Health Association. 1995:405-09.
2. American Academy of Pediatrics. *Rubella.* In: Peter G, ed. *1994 Red Book: Report of the Committee on Infectious Diseases.* 23rd ed. Elk Grove Village, IL: American Academy of Pediatrics; 1994:406-12.

Source: *A Macdonald, MD, Medical Officer of Health; K Petaski, BN, Public Health Nurse, Interlake Region, Selkirk, MB.*

GROUP A STREPTOCOCCAL NECROTIZING FASCIITIS FOURNIER'S GANGRENE — QUEBEC

Severe group A streptococcal infections became reportable in Quebec in March 1995. Twenty-eight cases of necrotizing fasciitis were reported in 1995 and 1996. Two of these cases had Fournier's gangrene (necrotizing fasciitis of the genital area); they were from the same semi-rural region of Quebec and were ill in October 1996. One other case of Fournier's gangrene, also from the same region, occurred in July 1996. This case, described here as well, was not a group A streptococcal infection and therefore was not reported. The three cases were initially admitted to three different hospitals.

Case 1

A 48-year-old Aboriginal male hunter, with non-insulin dependant diabetes, acquired a non-penetrating scrotal trauma after a fall at the end of September 1996. He presented to a local hospital on 11 October with vomiting, fever, palpitations, and an increased sensitivity in the genital area. The examination noted signs of fever, hypotension, and necrotizing lesions on the scrotum and penis. Laboratory results indicated the following: hyperglycemia (17 mmol/L); hyponatremia (121 mmol/L); and leucocytosis (33 x 10^9/L). Blood cultures indicated the presence of group A streptococcus, which was also found in the lesions, along

with group B streptococcus, *Staphylococcus aureus*, and three species of *Enterobacteriaceae*. The patient was given cefazolin but, within 24 hours, extensive cellulitis was evident. Treatment was changed to intravenous penicillin, clindamycin, and gentamycin from October 12 to 23.

Surgery on 13 October revealed foul-smelling skin necrosis with crepitation of the entire scrotum and perineum, 50% of the penis, and 12 cm of the hypogastrium. Extensive debridement with drainage of abscesses were carried out on 13, 16, and 18 October. The testicles were found to be ischemic but viable. A serious hemorrhage in the scrotal area required a fourth operation and transfusions on 18 October.

From 23 October, the general state of the patient appeared to improve: intravenous medication was stopped and hydrotherapy began. Oral ciprofloxacin was started to treat *Pseudomonas aeruginosa* and enterococcus which had colonized the wounds. On 28 October, the patient's temperature rose again and 3 days later, he was transferred to the regional medical centre: further debridement was performed on the same day with administration of broad-spectrum antibiotics for one week. Granulation appeared satisfactory around 5 November. The patient was released at the end of November, after reconstructive surgery. Close contacts were treated with cephalexin.

Case 2

A 36-year-old male in good health had a vasectomy in another hospital in the same region on 21 October 1996. That same evening, the patient experienced fever, chills, and scrotal edema. Amoxicillin was administered on 23 October, but was discontinued due to the presence of a rash the following night.

The patient was admitted to hospital on 24 October. A physical examination indicated that he was feverish (38.5° C) but non-toxic, with edema and necrosis of the scrotum, and cellulitis of the two iliac fossa and the hypogastrium. A culture of the scrotal wounds indicated the presence of group A streptococcus, along with *Staphylococcus aureus* and some *Enterobacteriaceae*. Leucocytosis was present (14.4 x 10^9/L). Scrotal fasciitis was diagnosed during surgery 12 hours later. Only streptococcus was isolated from a sample taken from the scrotum during surgery. Cellulitis and the fever disappeared 4 to 5 days later. On 4 November, tissues were further debrided with closure of the wound. The patient was released on 8 November without any medication. His family had been treated with cephalexin in the interim.

Case 3

A 49-year-old destitute male alcoholic, confined to a wheelchair for one year because of an amputation, was admitted on 25 July 1996; he presented with fever and scrotal pain which had been increasing over 1 week. The examination noted emaciation, low blood pressure (80/50), fever (39° C), and redness and edema on the scrotum and buttocks. Laboratory results indicated leucocytosis (15 x 10^9 /L) with left shift and hyponatremia (114 mmoL/L). Blood cultures were negative; culture from the lesions indicated enterococcus and two species of *Enterobacteriaceae*. Broad spectrum antibiotics were administered for 18 days; 2 days later his fever dropped. Repeated and extensive debridements were done along with hydrotherapy. Three operations were required between August and November to close the lesions.

Discussion

More than 500 cases of Fournier's gangrene have been described in the literature since 1883 when Fournier, the French dermatologist, first noticed the appearance of fulminating infections in the scrotum of healthy young men[1-7].

The average age of patients is 51 years and a number of them are diabetic[4-7]. The portal of entry for the disease is colo-rectal (33%), genito-urinary (21%), surgical (10%), and traumatic (6%)[7]; the infections are the result of mixed synergistic flora[3-7]. Group A streptococci, although rarely involved according to the literature, could imply a poor prognosis because of rapid necrosis, shock, and numerous visceral failures which often accompany the disease[8].

The principal serotypes of the 28 cases of group A streptococcal fasciitis found in Quebec in 1995 and 1996 were mainly M-1 (10 cases), M-3 (5 cases), and M-4 (5 cases); the two culture-confirmed cases of Fournier's gangrene in this report were M-2 and M-49. (J. Lefèvre, *Laboratoire de santé publique du Québec*, Montreal: personal communication, 1997.)

When facing a possible case of Fournier's gangrene, surgery should be quickly undertaken; the physical examination can underestimate the spread of the disease. The patient can be saved with repeated and extensive debridement, optimal supportive care, and the use of broad-spectrum antibiotics[4,5]. Subsequently, there is often a need for functional and esthetic reconstruction.

Acknowledgements

The author would like to thank Johanne Lefèvre, *Laboratoire de santé publique du Québec*, and the National Centre for Streptococcus, Edmonton, Alberta.

References

1. Viddeleer AC, Lycklama à Nijeholt GAB. *Lethal Fournier's gangrene following vasectomy*. J Urol 1992;147:1613-14.
2. Theiss M, Hofmockel G, Frohmüller HGW. *Fournier's gangrene in a patient with erectile dysfunction following use of a mechanical erection aid device*. J Urol 1995;153:1921-22.
3. Laor E, Palmer LS, Tolia BM et al. *Outcome prediction in patients with Fournier's gangrene*. J Urol 1995;154:89-92.
4. Laucks SS. *Fournier's gangrene*. Sur Clin North Am 1994;74:1339-52.
5. Paty R, Smith AD. *Gangrene and Fournier's gangrene*. Urol Clin North Am 1992;19:149-54.
6. Hejase MJ, Simonin JE, Bihrle R et al. *Genital Fournier's gangrene: experience with 38 patients*. Urol 1996;47:734-39.
7. Stephens BJ, Lathrop JC, Rice WT et al. *Fournier's gangrene: historic (1764-1978) versus contemporary (1979-1988) differences in etiology and clinical importance*. Am Surgeon 1993;59:149-54.
8. Bisno AL, Stevens DL. *Streptococcal infections of skin and soft tissues*. N Eng J Med 1996;334:240-45.

Source: *M Govette, MD, Service de microbiologie et maladies infectieuses du Centre Hospitalier Régional de Trois-Rivières, Trois-Rivières, Quebec.*

Editorial Comment

Invasive group A streptococcal disease is now reportable in six Canadian provinces and territories, including Quebec. Surveillance from Canada and the United States indicates that necrotizing fasciitis (NF) represents between 6% and 10% of all invasive group A streptococcal infections[1,2]. Group A streptococcal necrotizing fasciitis is particularly devastating when it is associated with the streptococcal toxic shock syndrome, with case fatality rates over 50%.

Despite the recent attention group A streptococcal infections have received in the lay press and the medical literature, it is important to remember that necrotizing fasciitis is a clinical pathological syndrome that may be caused by a variety of bacteria. One review identified mixed aerobic and anaerobic species from deep tissue swabs of 68% of cases of NF, with an average of 4.6 bacterial isolates per site of infection[3]. Other bacteria commonly associated with NF include aerobes, such as *Staphylococcus aureus*, *Escherichia coli*, and anaerobes, such as *Peptostreptococcus* spp., *Bacteroides fragilis* spp., and *Clostridium* spp.

The etiology of necrotizing fasciitis often reflects the bacterial flora of the surronding mucous membranes. As alluded to in the above case reports, NF of the perineal area, including Fournier's gangrene, often reveal mixed anaerobic and aerobic organisms. Empiric therapy should be broad enough to cover these mixed pathogens.

All cases of necrotizing fasciitis, regardless of etiology, require early recognition and prompt therapy. New treatments, such as intravenous immunoglobulin (IVIG), have been tried in individual cases with some success. While the results of more thorough evaluations of IVIG are anticipated, therapy for NF remains the combination of parenteral antibiotics and surgical debridement.

References

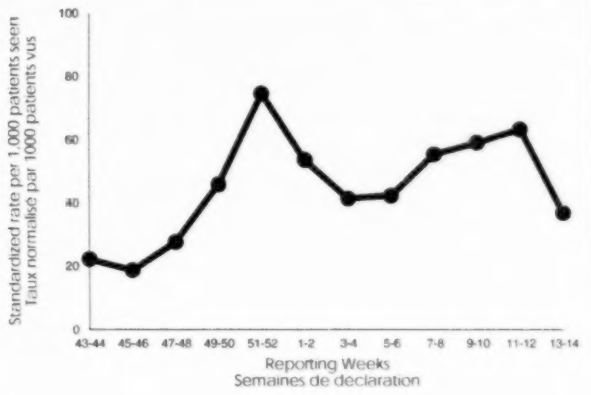
1. Davies HD, McGeer A, Schwartz B et al. *Invasive group A streptococcal infections in Ontario, Canada*. N Engl J Med 1996;335:547-54.
2. Hoge CW, Schwartz B, Talkington DF et al. *The changing epidemiology of invasive group A streptococcal infections and the emergence of streptococcal toxic shock-like syndrome*. JAMA 1993;269:384-89.
3. Brook I, Frazier EH. *Clinical and microbiologic features of necrotizing fasciitis*. J Clin Microbiol 1995;33:2382-87.

Erratum

RESPIRATORY VIRUS SURVEILLANCE
FluWatch Project, Vol. 23-10, page 77.

Figure 1 should be replaced by the figure below.

Figure 1
Standardized rates of ILI across Canada by 2-week periods, reported to FluWatch, 26 October 1996 - 6 April 1997



The Canada Communicable Disease Report (CCDR) presents current information on infectious and other diseases for surveillance purposes and is available through subscription. Many of the articles contain preliminary information and further confirmation may be obtained from the sources quoted. Health Canada does not assume responsibility for accuracy or authenticity. Contributions are welcome (in the official language of your choice) from anyone working in the health field and will not preclude publication elsewhere.

Scientific Advisors	Dr. John Spika	(613) 957-4243
	Dr. Fraser Ashton	(613) 957-1329
Editor-in-Chief	Eleanor Paulson	(613) 957-1788
Assistant Editor	Nicole Beaudoin	(613) 957-0841
Desktop Publishing	Joanne Regnier	

Submissions to the CCDR should be sent to the Editor-in-Chief, Laboratory Centre for Disease Control, Tunney's Pasture, Address Locator 0602C2, Ottawa, Ontario K1A 0L2.

To subscribe to this publication, please contact:
Subscription Administrator
Canadian Medical Association
P.O. Box 8650
Ottawa, Canada K1G 0G8
Tel. No.: (613) 731-8610, ext. 2028
FAX: (613) 523-0937

Price per year:
Base subscription : $80.00 ($85.60 incl. G.S.T.) in Canada; $105 (U.S.) outside Canada.
Premium subscription : $150.00 ($160.50 incl. G.S.T.) in Canada; $175 (U.S.) outside Canada.